CEB Working Paper

What makes Vietnamese (not) attend periodic general health examinations? A cross-sectional study

Quan-Hoang Vuong, Quang-Hoi Vu and Thu-Trang Vuong

Background: General health examinations (GHE) have become an increasingly common measure for preventive medicine in Vietnam. However there has still been a lack of understanding about what make Vietnamese (not)attend GHE. The effects of budget or time constraints remain to evaluated. Better-informed policy making needs these inputs.

Aim & Objectives: This study aims to investigate factors that may affect Vietnamese behaviors with respect to periodic GHE. Main objectives are to: i) explore empirical relationships between influencing factors and periodic GHE frequencies; and, ii) predict the probabilities of attending GHE and associated conditions.

Materials and Methods: The study uses a 2,068-observation categorical dataset obtained from a Vietnamese survey in 2016Q4. The analysis is then performed using the methods of baseline-category logits for establishing relationships between predictor and response variables.

Results: There exist relationships among: (i) GHE expenditure and time consumption; (ii) health priority and sensitivity to health data; (iii) insurance status, and (iv) the frequency of GHE, with most p's < 0.01.

The general trend shows that psychological factors tend to increase the probability of attending GHE, while costs and time consumption diminish it.

Conclusion: (a) People tend to attend GHE if they have resources and a priority for health, with a 72.7% probability; (b) Expenditure and time consumption obstacles reduce the probability of periodic GHE; (c)

Setting a health priority and having habit of consuming health data tend to increase the probability of attending periodic GHE; (d) Health insurance should play a positive role in promoting GHE.

Keywords: General health examination, Health insurance, Medical costs, Health service consumers, Vietnam

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What makes Vietnamese (not) attend periodic general health examinations?

A cross-sectional study

Quan-Hoang Vuong[1]

Universite Libre de Bruxelles, Centre Emile Bernheim

50 Ave. F.D. Roosevelt, Brussels 1050, Belgium

Email: qvuong@ulb.ac.be

and

FPT University, FPT School of Business

VAS-FSB Building, Block C, My Dinh 1, Hanoi, Vietnam

Email: hoangvq@fsb.edu.vn

Phone: +84-9-0321-0172

Quang-Hoi Vu

Bitexco Group

1st Floor, The Manor Towers, Me Tri, Tu Liem, Hanoi, Vietnam

Email: vuquanghoi@bitexco.com.vn

Thu-Trang Vuong

Sciences Po Paris, Campus Europeen de Dijon

14 Victor Hugo, Dijon 21000, France

Email: thutrang.vuong@sciencespo.fr

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[1] Corresponding author.

Abstract

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Introduction

Along with the rise in income and life standards, periodic health examinations and health care become more and more crucial. In the United States, the first periodic general health examinations (GHE) programs have been launched since early 20th century, but it took some time before they gain proper attention among the population. Periodic GHE are considered a positive solution to diminish fatality rate [1], and provide people with a chance to access health care resources [2], especially for children and elderly [3-5], by closely following their health status and, in case of illness, detecting possible symptoms early on [8], making it possible to receive timely, appropriate treatment [4]. In this manner, one could see periodic GHEs as a necessity [7].

However, does periodic GHE truly work for everyone? In reality, there are instances where periodic GHE waste not only medical resources and personnel for medical service providers but also time, energy and money for people who take these examinations [9]. Moreover, there is not enough evidence to conclude that people with frequent GHE would lead a longer, healthier life than those without [3, 9]; nor is there solid proof on the concrete benefits of GHE [10-18]. This uncertainty affects the mentality of both medical personnel and health service consumers.

At the same time, other elements tied to the undertaking of periodic GHE also greatly affect people's readiness to have frequent health checks. For example, the cost of medical examinations can greatly diminish participation in periodic GHE [7]. Another factor that drives people away from GHE is unnecessary examinations that may take up a large part of each medical check while causing extra costs [19-21]. Apart from the above, there are still people who do not have access to qualified medical services [22-23].

Faced with these shortcomings, health insurance is often used as solution to raise the frequency of GHE among the population. It has been well documented in the literature that insured people tend to have periodic GHE more often [26-31] while most of those without health insurance only become hospitalized in emergency, which usually lead to belated treatment and higher fatality rates [32-33]. On the other hand, opposed opinions have pointed out that health insurance merely incite people to use of healthcare services more often rather than improving general health – in extreme cases, it might even aggravate a patient's condition due to the fact that medicines provided within the scope of insurance are not adequate to treat the illness [27, 30]. This being said, according to a survey conducted to find out the tendencies of studies, 51 out of 54 studies on health insurance conclude in favor of – or partly in favor of – the positive correlation between having a health insurance and health improvement [34].

Other than having health insurance, the habit of following up on one's own health is also a proponent to having more frequent GHE. Most of these people visit clinics or hospitals for health checks [35-37]. A study focused on elderly people in China shows that, among those who come for periodic GHE, the most frequent patients are either retired civil servants, with certain knowledge about health, or people with friends/relatives working in the medical sector [38]. This indicates that people with certain knowledge or a reliable source of knowledge on healthcare are more inclined to hold health among their priorities.

Given the importance of healthcare in general and periodic GHE in particular, as well as the limits and contradictions present in the extant literature on GHE, it is necessary for new studies to further confirm and complement previously reported results.

Aim & Objectives

This study aims to investigate psychological and sociodemographic factors that may possibly affect Vietnamese health consumers' behaviors with respect to periodic GHE. The major objectives are to: i) explore empirical relationships between factors in considerations and periodic GHE frequencies; and,

ii) predict the probabilities of attending GHE conditional upon factors whose influences are established by the empirical data. In light of the above, the subsequent analysis is performed with the purpose of answering the important question: "What make people attend period GHE and under what conditions the practice will become possible for the society?"

The identification and confirmation of significance of discernible factors through empirical evidence will later help suggest improvements for public health policy [39].

Material and Methods

The dataset, consisting of 2,068 observations, has been collected from surveys at clinics, schools, companies and households in Hanoi and nearby provinces, conducted during September-October 2016.

Investigation was done on random individuals, not picked out by any criteria. Vuong & Associates is the main responsible of data collecting, with ethical standards stated in the surveying institution's Decision V&A/07/2016 dated September 15, 2016. The data team directly gathers signed questionnaires with consent and cooperation from participants. The questionnaires were then checked and signed off by a team member, the supervising person, the head of V&A and the principal researcher.

Statistical Analysis

Raw data is entered in MS Excel before being converted into CSV. Data treatment and categorical structuring for multi-way contingency data tables is executed in R 3.3.1. Estimates are analyzed using BCL model as specified in [38], enabling the detecting of empirical relations between nominal variables. Both response and predictor variables in this study are categorical variables. The multinomial logistic regression model is used to predict the likelihood of a category of dependent variable Y in various conditions of independent variable $\mathbf{x}$, so as to evaluate the impact of dependent variables as well as their tendencies to change when the independent variable change.

Despite log-linear specification being a possible choice, the application of logistic regression proves to be more efficient because: a) the model is comprised of predetermined number of variables, thus showing each variable's significance more clearly; and, b) explanations for estimated coefficients in empirical calculations can be acquired directly. It is also noteworthy that the BCL model can provide the odds ratio between a baseline category and any category within one variable.

The general equation of the baseline-categorical logit model is:

$$\ln \frac{\pi_j(\mathbf{x})}{\pi_J(\mathbf{x})} = \alpha_j + \boldsymbol{\beta}'_j \mathbf{x}, \qquad j = 1, \dots, J-1.$$

in which $\mathbf{x}$ is the independent variable; and $\pi_j(x) = P(Y = j|x)$ its probability. Thus $\pi_j = P(Y_{ij} = 1)$ with Y being the dependent variable.

In the logit model in consideration, the probability of an event is calculated as:

$$\pi_j(\mathbf{x}) = \frac{\exp(\alpha_j + \boldsymbol{\beta}'_j \mathbf{x})}{1 + \sum_{h=1}^{J-1} \exp(\alpha_h + \boldsymbol{\beta}'_h \mathbf{x})}$$

with $\sum_j \pi_j(\mathbf{x}) = 1$; $\alpha_J = 0$ và $\boldsymbol{\beta}_J = 0$; in which n is the number of observations in the sample, j the categorical values of an observation i, and h a row in basic matrix $\mathbf{X}_i$. Estimated probabilities can be used to predict the possibilities of the person's last GHE (since less than a year, over a year, or not recalled) under certain conditions of hesitation—due to cost and time consumption—or readiness—because heath is a priority or because attending health checks is part of the habit—and in relation to the respondent's health insurance status [39-41].

Estimated coefficients are computed through multi-variable logistic regression and are used to calculate empirical probabilities [42-45]. The statistical significance of predictor variables in the model are determined based on $z-$ value and $p-$ value; with $p < 0.05$ being the conventional level of statistical significance required for a positive result [43].

Dataset:

Collected data reflect the respondent's answer on the reasons to their hesitation/readiness to attend GHE. At the same time, the study also evaluates the influence of health insurance (or lack thereof) and the reasons of hesitation/readiness on the length of time since the respondent's last heath check.

When considering their hesitation towards GHE, reasons include their view of GHE as incurring much consumption of time ("Wsttime"), or causing a concern about related expenditures ("Wstmon"). As for those ready to attend GHE, the two reasons mentioned are the fact that health is their top priority in life ("HthyPriority") and that they frequently follow updates on their health status as well as information regarding society's general health matters ("FlwHealth"). These variables are dichotomous, consisting of the categories "Yes" and "No".

In the same manner, the variable representing the presence of health insurance ("HealthIns") also has values "Yes" (the person is insured) and "No" (uninsured).

The response variable is the time since the person's last GHE ("RecPerExam"), with three categories: i) "less12": Last GHE since under 12 months; ii) "g12": Last GHE since 12 months or more, and; "unknown": the respondent does not remember or has not attended GHE ever.

The majority of participants are in their twenties, with the sample's average age at approximately 29 (63.15% are <30 y.o.). Females are more willing to answer questionnaires than males (64.80% are female); university graduates take up a large portion of the sample (66.88%). Seeing as health insurance has become obligatory, 82.21% participants are insured. The average time for fully answering one questionnaire is between 7 to 15 minutes.

Table 1. A few basic statistical descriptions

Characteristics	N	Percentage (%)
Age		
<30 (y.o)	1,306	63.15
30-49	643	31.09
≥50	119	5.76
Sex		
Male	728	35.20

Female	1,340	64.80
Education		
Junior high school	142	6.86
High school	416	20.12
University/College	1,383	66.88
Post-graduate	127	6.14
Health insurance		
Yes	1,700	82.21
No	368	17.79
Hesitation due to consumption of time		
Yes	1069	51.69
No	999	48.31
Hesitation due to related expenditures		
Yes	770	37.23
No	1,298	62.77
Readiness due to health as a top priority		
Yes	1,675	81.00
No	393	19.00
Readiness due to sensitivity to health matters		
Yes	977	47.24
No	1,091	52.76
Time since last GHE		
Under 12 months	1,059	51.21
12 months or more	493	23.84
Unknown (not recalled)	516	24.95

Table 1 shows that, among 2,068 participants, concerns that GHE might just be a "waste of time" is the main cause to their hesitation (nearly 52% participants chose this as a reason). In addition, >37% see GHE expenditures as a concern. As for reasons for readiness to have medical checks, health being top priority turns out to be the most favored answer (81%), followed by respondents' receptiveness and

sensitivity to updates on general health matters and society's concerns (>47%). GHE appears to be gaining attention, with 1,059 people (51.21%) attending a general health check within <12 months.

Results

Employing logistic regression estimations with dependent variable "RecPerExam" against five independent variable "Wsttime", "Wstmon", "HthyPriority", "FlwHealth" and "HealthIns" (from the multi-way contingency table provided in Appendix A) yield the results reported in Table 2.

Table 2: Estimation results

	Intercept	"Wsttime"	"Wstmon"	"HthyPriority"	"FlwHealth"	"HealthIns"
		"Yes. Wsttime"	"Yes.Wstmon"	"Yes. HthyPriority"	"Yes. FlwHealth"	"Yes. HealthIns"
	β_0	β_1	β_2	β_3	β_4	β_5
logit(unknown|less12)	-0.053 [-0.306]	0.289* [2.343]	0.581*** [4.599]	-0.107 [-0.711]	-0.732*** [-6.242]	-0.740*** [-5.174]
logit(g12|less12)	-0.098 [-0.562]	0.662*** [5.243]	0.474*** [3.713]	-0.578*** [-3.990]	-0.354** [-2.983]	-0.686*** [-4.676]
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05; z-value in [square brackets]; baseline category for: "Wsttime" = "no"; "Wstmon" = "no"; "HthyPriority" = "no"; "FlwHealth" = "no"; and, "HealthIns" = "no". Log-likelihood: -151.22 on 52 degrees of freedom (df). Residual deviance: 91.22 on 52 df.						

Estimated coefficients and test statistics reported above suggest that there exist relationships between resource factors (money, time), psychological factors (health priority, information update), macro policy factor (health insurance), and the practices of attending periodic GHE. These relationships are presented in functional forms of Equations 1 and 2, as follows.

$$\ln\left(\frac{\pi_{\text{unknown}}}{\pi_{\text{less12}}}\right) = -0.053 + 0.289 \times \text{Yes. Wsttime} + 0.581 \times \text{Yes. Wstmon}$$
$$- 0.107 \times \text{Yes. HthyPriority} - 0.732 \times \text{Yes. FlwHealth} \qquad \text{Eq.1}$$
$$- 0.740 \times \text{Yes. HealthIns}$$

$$\ln\left(\frac{\pi_{g12}}{\pi_{less12}}\right) = -0.098 + 0.662 \times \text{Yes. Wsttime} + 0.474 \times \text{Yes. Wstmon}$$

$$- 0.578 \times \text{Yes. HthyPriority} - 0.354 \times \text{Yes. FlwHealth}$$

Eq.2

$$- 0.686 \times \text{Yes. HealthIns}$$

Table 3 presents distributions of probabilities of time gaps for respondents' most recent GHE participations conditional upon reasons for hesitation (resource constraints: money, time), readiness (psychological factors) and health insurance status (macro policy influence).

Table 3: Probabilities of GHE time gaps against resource, psychology and insurance conditions

"HealthIns"	"yes"								"no"							
"RecPerExam"	"unknown"															
"FlwHealth"	"yes"				"no"				"yes"				"no"			
"HthyPriority"	"yes"		"no"		"yes"		"no"		"yes"		"no"		"yes"		"no"	
"Wsttime"|"Wstmon"	"yes"	"no"	"yes"	"no"	"yes"	"no"	"yes"	"no"	"yes"	"no"	"yes"	"no"	"yes"	"no"	"yes"	"no"
"yes"	0.230	0.162	0.206	0.152	0.351	0.266	0.308	0.243	0.317	0.245	0.267	0.214	0.441	0.364	0.372	0.315
"no"	0.214	0.142	0.204	0.141	0.340	0.245	0.318	0.237	0.318	0.232	0.287	0.218	0.456	0.361	0.408	0.332
"RecPerExam"	"g12"															
"FlwHealth"	"yes"				"no"				"yes"				"no"			
"HthyPriority"	"yes"		"no"		"yes"		"no"		"yes"		"no"		"yes"		"no"	
"Wsttime"|"Wstmon"	"yes"	"no"	"yes"	"no"	"yes"	"no"	"yes"	"no"	"yes"	"no"	"yes"	"no"	"yes"	"no"	"yes"	"no"
"yes"	0.276	0.217	0.396	0.325	0.288	0.243	0.406	0.356	0.360	0.309	0.487	0.434	0.343	0.316	0.464	0.437
"no"	0.176	0.131	0.270	0.208	0.192	0.154	0.288	0.239	0.249	0.202	0.360	0.304	0.244	0.215	0.351	0.318
"RecPerExam"	"less12"															
"FlwHealth"	"yes"				"no"				"yes"				"no"			
"HthyPriority"	"yes"		"no"		"yes"		"no"		"yes"		"no"		"yes"		"no"	
"Wsttime"|"Wstmon"	"yes"	"no"	"yes"	"no"	"yes"	"no"	"yes"	"no"	"yes"	"no"	"yes"	"no"	"yes"	"no"	"yes"	"no"
"yes"	0.494	0.621	0.398	0.523	0.361	0.491	0.286	0.401	0.323	0.446	0.246	0.352	0.216	0.320	0.164	0.248
"no"	0.610	0.727	0.526	0.651	0.468	0.601	0.394	0.524	0.433	0.566	0.353	0.478	0.300	0.424	0.241	0.350

Discussion

From the regression equations (Eqs. 1-2), it can be remarked that variables "Wsttime", "Wstmon" receive positive coefficients (+) while coefficients for variables "HthyPriority", "FlwHealth" are negative

(-). This shows influences in opposite directions between reasons of hesitation and reasons of readiness towards GHE. In addition, the magnitude of "Wsttime" is larger than that of "Wstmon" in Eq.1, suggesting that for those with stronger propensity to attend periodic GHE (<12-month time gap), consumption of time is of greater concern than medical expenditure.

It is also noteworthy that "HealthIns" has the highest absolute values for estimated coefficients, $|\beta_5|$, being 0.740 and 0.686 (p-value <0.001), respectively. They suggest that health insurance has the most influence on the time gap since respondents' last GHE.

The largest number in Table 3 shows that insured persons who do not hesitate to attend GHE for time or money reasons, and who have set a higher priority for health matters and had sensitivity to health status/updates, are the most likely (72.7%) to attend periodic GHE.

Figure 1. Likelihood of periodic GHE (<12 months) against sensitivity to health update
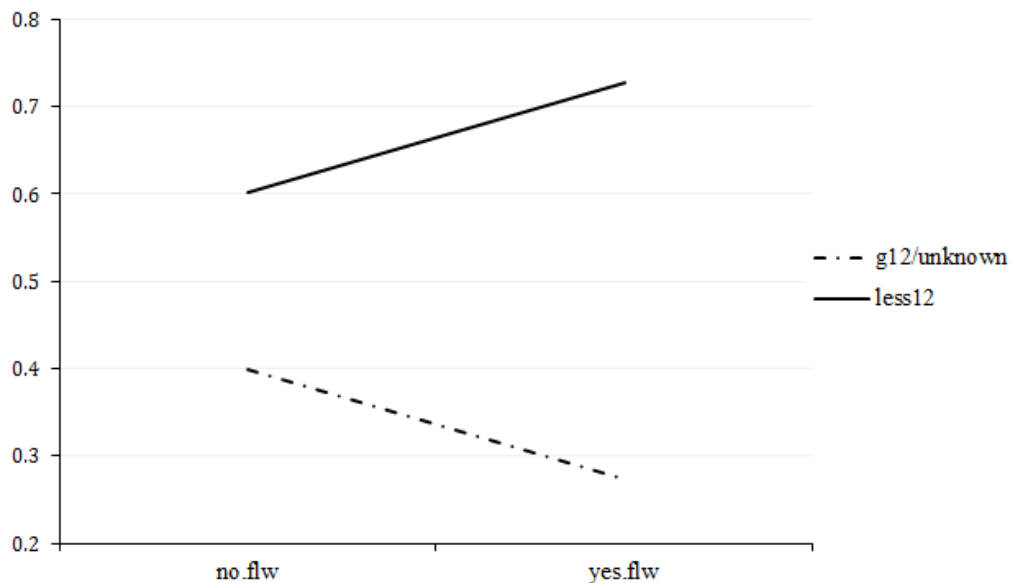

Figure 1 presents changing empirical probabilities of the time gap since the person's most recent GHE, hesitant and ready to have health checks due to health being their first priority. The lines "less12" (representing propensity to attend period GHE) and "g12/unknown" (propensity to avoid GHE) move in opposite directions from "no.flw" to "yes.flw". This tendency shows that being diligent on following their

own health status raises the likelihood of having recently had a GHE among surveyed people. The same conclusion can be reached for those who give a high priority to their health status (see Table 3).

As for people who are ready to have GHE due to health being their first priority and sensitivity to heath status/updates, as well as being not at all reluctant to check their health for reasons of time, the probabilities of them having recently had GHE unveil a rather expected prediction that when being free from financial concerns, people would likely show a strong propensity to attend periodic GHE. The same effect is observed with those who see consumption of time for GHE as "costly".

In addition, probabilities provided in Table 3 suggest that that insured people, with or without financial concerns, are always more likely to attend periodic GHE. Meanwhile, for those who have no health insurance, the probability of attending GHE rises only when they are not worried about financial issues.

Conclusion

When worries about financial or time obstacles diminish, people tend to be more regularly attend GHE, as they do have the need and the means to examine their general health, even when no apparent symptoms prompt them to, in order to detect risks of illnesses early on and undergo appropriate treatment if required. On the other hand, when financial difficulties or dissatisfaction due to prolonged waiting time during GHE sessions come into play, people are much less willing to have periodic GHE. This avoidance does happen at their own peril.

This conclusion is intuitive, because periodic GHE is expected to be a regular activity whose costs add up to that of general healthcare costs. However, GHE are not a "necessity good", in the sense that it would be downsized from consumption when the household/individual budget becomes tight. Therefore, people with lower income tend to only make medical appointments in case of apparent symptoms or even with an emergency. For these people, public hospitals are also a favored choice due to their lower costs. This often leads to public hospitals being overloaded with patients, thus prolonging

waiting time for each patient, giving them a bad impression of health checks. Another consequence of hospitals being overloaded is the reduction in medical service quality. This would in turn affect participants' mentality, making them reluctant to take the next appointment because the GHE did not give them adequate results while consuming a lot of their time.

Faced with these challenges, priority and regularity in caring for one's health could in part lessen hesitation towards periodic GHE. In fact, people with a true care for their health are often willing to spend time and money to obtain updates on their general health status. This, to them, is to minimize the risk of discovering illnesses only at critical necessity stages, thus avoiding much greater uncertainties and expensive treatments later on.

Health insurance clearly has positive impacts on promoting the good practice of attending periodic GHE. Even when financial concerns exist, the insured are still more likely to have regular GHE. The reason is that costs are the most important factor hindering people from having GHE periodically [7, 19]. In Vietnam, health insurance can reimburse up to 80% of all medical costs to patients – apparently an attractive benefit, especially to those with lower income. Moreover, with a health insurance, people may opt for private clinics/hospitals, where services are more friendly and infrastructure no less adequate than public hospitals.

Recommendation

Based on results from the research, some solutions to promote periodic GHE are recommended for the sake of better health [37]. Employers and social programs should allocate a reasonable budget to support employees/recipients in attending periodic GHE. In addition, health insurance benefits should adequately cover periodic GHE, in combination with lower expenditures as the health insurance agency has the power of negotiating with health services providers. There can also be a better flexibility for GHE offers so that participants are able to pick relevant choices of medical tests/checks, making consumption of time less an obstacle. The public health authority may also need to do more with respect to educating

the public about the value of GHE and providing them with updates and options, which help their decisions on attending periodic GHE better-informed.

Limitation of the study

A major limitation of this study is due to its geographical concentration on Hanoi and its vicinity. A nationwide survey may exhibit regional differences and shifting in behaviors if control variates enter the analytical models. Such a dataset is for the time being beyond our capacity and will certainly require a much stronger research effort in the future.

Appendixes

Appendix A: Distribution of responses against predictor categories for "Wsttime", "Wstmon", "HthyPriorit", "FlwHealth" and "HealthIns"

"HealthIns"	"Wsttime"	"Wstmon"	"HthyPriority"	"FlwHealth"	"RecPerExam"		
					"unknown"	"less12"	"g12"
"no"	"no"	"no"	"no"	"no"	15	6	17
				"yes"	2	3	3
			"yes"	"no"	13	29	13
				"yes"	15	41	10
		"yes"	"no"	"no"	1	0	3
				"yes"	0	0	1
			"yes"	"no"	4	4	0
				"yes"	3	8	2
	"yes"	"no"	"no"	"no"	9	1	11
				"yes"	1	0	1
			"yes"	"no"	13	9	10
				"yes"	5	16	10

		"yes"	"no"	"no"	4	6	11
				"yes"	0	1	0
			"yes"	"no"	25	7	10
				"yes"	10	7	8
"yes"	"no"	"no"	"no"	"no"	23	63	27
				"yes"	6	13	4
			"yes"	"no"	45	93	35
				"yes"	56	285	32
		"yes"	"no"	"no"	3	7	4
				"yes"	0	3	3
			"yes"	"no"	23	31	13
				"yes"	12	13	12
	"yes"	"no"	"no"	"no"	16	28	13
				"yes"	3	7	6
			"yes"	"no"	42	73	34
				"yes"	16	82	43
		"yes"	"no"	"no"	18	20	17
				"yes"	2	5	6
			"yes"	"no"	80	90	72
				"yes"	51	108	62

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